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ENVIRONMENTAL IMPACT ANALYSIS OF PROPOSED REALIGNMENT OF FORCES--ETC(U)
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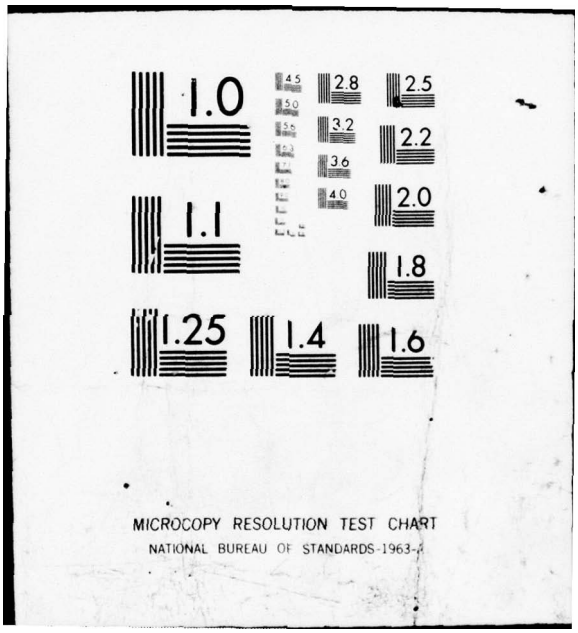
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(9) ENVIRONMENTAL REPORT.

(6) ENVIRONMENTAL
IMPACT ANALYSIS OF PROPOSED
REALIGNMENT OF FORCES
AT KINCHELOE AFB, MICHIGAN.

(11) AUGUST 1976

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USAF ENVIRONMENTAL HEALTH LABORATORY
McCLELLAN AFB CA

USAF ENVIRONMENTAL HEALTH LABORATORY
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ENVIRONMENTAL IMPACT ANALYSIS FOR KINCHELOE AFB, MICHIGAN

AND WURTSMITH AFB, MICHIGAN

I. INTRODUCTION

A. SCOPE:

Each Air Force installation has been directed to prepare a description of its existing environment. This description, the Tab A-1 Environmental Narrative, is prepared according to detailed guidelines. These guidelines list and define the environmental attributes to be addressed and provide general guidance on types of data to be included. Furthermore, in order that these documents be readily and easily comparable when evaluating more than one base, Air Force has adopted a standard Air Force Environmental Reference Number (AFERN) System. The AFERN System results in standardized presentation in the installation Tab A-1. Below is a list enumerating by AFERN and environmental attribute the areas of environmental concern dealt with in this document.

AFERN	ENVIRONMENTAL ATTRIBUTE
3.0	NATURAL ENVIRONMENT
3.1	EARTH
3.1.1	PHYSIOGRAPHY
3.1.2	GEOLOGY
3.1.2.1	BEDROCK
3.1.2.2	SURFICIAL
3.1.3	SOILS
3.1.3.1	CHARACTERISTICS
3.1.3.2	BEARING STRENGTH
3.1.3.3	SUSCEPTABILITY TO EROSION
3.1.4	POLLUTION
3.1.4.1	SOLID WASTE
3.2	WATER
3.2.1	HYDROLOGY
3.2.1.1	SUBSURFACE HYDROLOGY
3.2.1.1.1	AQUIFER CHARACTERISTICS
3.2.1.1.2	GROUND WATER MOVEMENT
3.2.1.2	SURFACE HYDROLOGY
3.2.1.2.1	DRAINAGE AREAS
3.2.1.2.2	RIVERS AND STREAMS
3.2.2	WATER QUALITY
3.2.3	POLLUTION
3.2.3.1	SEWERAGE
3.2.3.1.1	NPDES REQUIREMENTS
3.2.3.1.2	RECEIVING WATERS
3.2.3.1.3	STORM DRAINAGE

AFERN	ENVIRONMENTAL ATTRIBUTE
3.3	AIR
3.3.1	METEOROLOGY
3.3.2	EMISSIONS INVENTORY
3.3.2.1	EMISSION INVENTORY, REGIONAL
3.3.2.2	SUMMARY OF ON-BASE AIR POLLUTANT EMISSIONS
3.3.3	AMBIENT AIR QUALITY
3.3.3.1	AMBIENT AIR QUALITY, REGIONAL
3.3.3.2	MONITORING SITES WITHIN 10 MILES OF THE BASE
3.3.3.3	ON-BASE SAMPLING LOCATION AMBIENT AIR QUALITY
3.3.3.4	AIR QUALITY MAINTENANCE AREA (AQMA) DESIGNATES
3.3.3.5	AIR POLLUTION EPISODES
3.4	BIOTIC ENVIRONMENT
3.4.1	PLANTS
3.4.1.1	NATURAL LAND VEGETATION
3.4.1.2	AQUATIC PLANTS
3.4.1.3	FIELD CROPS
3.4.1.4	THREATENED AND ENDANGERED SPECIES
3.4.1.5	CANTONMENT PLANTINGS
3.4.2	ANIMALS
3.4.2.1	LARGE ANIMALS
3.4.2.2	PREDATORY BIRDS
3.4.2.3	SMALL GAME AND SONG BIRDS
3.4.2.4	FISH, SHELLFISH AND WATERFOWL
3.4.2.5	AMPHIBIANA AND REPTILES
3.4.2.6	SMALL MAMMALS
3.4.2.7	THREATENED AND ENDANGERED SPECIES
3.7	NATURAL HAZARDS
4.4	ACTIVITY SYSTEMS AND PLANS
4.4.2	UTILITIES
4.4.2.1	CIVILIAN COMMUNITY UTILITIES
4.4.2.2	ON-BASE UTILITIES
4.4.2.2.1	WATER
4.4.2.2.2	SEWERAGE
4.4.2.2.3	ELECTRICAL
4.4.2.2.4	LIQUID FUEL SYSTEMS
4.4.2.2.5	HEATING
4.4.2.2.6	NATURAL GAS
4.4.2.2.7	STORM DRAINAGE
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4.4.3.7	SPECIAL AREAS
4.4.3.7.1	RADIOACTIVE BURIAL SITES
4.4.3.7.2	ELECTROMAGNETIC, RADIATION HAZARD AREAS
4.4.3.7.3	HISTORICAL/ARCHEOLOGICAL SITES

In the discussions of potential impact presented later, each environmental attribute is not necessarily addressed separately, but each attribute has been considered in assessing potential impact. For example, discussion of potential impact on the biotic environment (AFERN 3.4) is based on a review of all attributes noted above as subdivisions of AFERN 3.4 (i.e. 3.4.1, 3.4.2, ... 3.4.2.7). In all cases where a discussion is referenced to an environmental attribute (and AFERN), this discussion is based on a review of all subdivisions of that attribute included in the above list.

B. SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

1. Proposed Action: The proposed action involves closure of Kincheloe AFB MI. Present strength of Kincheloe AFB is 2698 military and 467 civilian positions. These positions would be eliminated, except for the required increase noted below for Ellsworth AFB SD and K.I. Sawyer AFB MI. The sixteen B-52H aircraft at Kincheloe AFB will be relocated, fourteen to Ellsworth AFB and two to K.I. Sawyer AFB. Personnel reassignments commensurate with aircraft relocation will be increases in military authorizations of 190 at Ellsworth AFB and 112 at K.I. Sawyer AFB.

2. Alternative 1 involves closure of Wurtsmith AFB MI. Present strength of Wurtsmith AFB is 2504 military and 419 civilian positions. These positions would be eliminated except for the required increases noted below for Ellsworth AFB SD and K.I. Sawyer AFB MI. The sixteen B-52H aircraft at Wurtsmith AFB will be relocated, fourteen to Ellsworth AFB and two to K.I. Sawyer AFB. Personnel reassignments commensurate with aircraft relocation will be increases in military authorizations of 190 at Ellsworth AFB and 112 at K.I. Sawyer AFB.

3. Alternative 2 is a no action alternative; all installations remain in operation at present strengths.

C. RESEARCH APPROACH

All impact analyses are based on data provided to the project personnel in the Tab A-1 Environmental Narrative for the bases concerned or in the Description of Proposed Actions and Alternatives (DOPAA). These documents were provided from Headquarters, Strategic Air Command (SAC) and were prepared by the command (DOPAA) or the base (Tab A-1).

Other sources of information are referenced in Part III-D or in the following list of agencies/individuals contacted:

1. National Emission Data System (NEDS), USEPA.

2. AP-42, Compilation of Air Pollutant Emission Factors, USEPA, March 1975.

3. Ibid, Supplement, April 1975.

4. USAF Aircraft Pollution Emission Factors and Landing and Takeoff, AFWL-TR-74-303, Air Force Weapons Laboratory, Kirtland AFB NM, February 1975.

5. Furtado, V.C.; D.R. Case, and J.R. Stencel (1972) Burial of Radioactive Waste in the USAF. RHL-TR-72W-9, USAF Radiological Health Laboratory, Wright-Patterson AFB OH.

The methodologies employed in assessing impact are discussed by environment attribute (AFERN) below.

EARTH (AFERN 3.1)

The basic soil characteristics of the soil in the area and the surrounding terrain were determined to be unaffected by this action with the possible exception of drainage problems that may exist, and are noted and discussed.

WATER (AFERN 3.2)

The probable impact on water supply and water quality is related to the quantity of water consumed and the quantity of wastewater discharged to the receiving bodies of water. Water consumption can be estimated by multiplying the number of consumers by an average unit use factor, gallons per capita per day (gpcd). The quantity of wastewater discharged can be estimated the same way. The numbers of personnel involved in a strength reduction, no change, or increase were extracted from the DOPAA or the Tab A-1. Unit use factors were either taken from the Tab A-1 if available, or they were assumed values. Decreased demands were considered favorable. Increased demands were judged relative to the adequacy of the existing sewage treatment facilities and water supplies to accomodate the increased demands.

AIR (AFERN 3.3)

The probable impact on air quality is related to the change in the amount of pollutants discharged to the atmosphere. The five pollutants of concern are suspended particulates, oxides of sulfur, oxides of nitrogen, unburned hydrocarbons and carbon monoxide. Pollutant emissions can be estimated by using operational factors supplied by the base and emission factors developed by either the US EPA or the USAF. Utilizing the mentioned sources an emission inventory is prepared for each base. The numbers of personnel and operations involved in a reduction, closure or no action were extracted from the DOPAA or the Tab A-1. Utilizing the changes in personnel and operations, a new emission inventory was developed for each base. These two emission inventories were then compared with the respective county emission inventory, furnished by the regional EPA office, to determine the percentage reduction in total county emissions.

BIOTIC ENVIRONMENT (AFERN 3.4)

In the absence of major programmed construction or other gross physical modification of existing environment, assessment of potential impact on the biotic environment resulting from a proposed action or alternative approaches the subjective (i.e., it is largely based upon opinion of a competent biologist). A degree of objectivity can be included if each action or alternative is assessed by the same criteria. Bearing in mind that both positive and negative impact can result, the criteria used in reaching the conclusions enumerated in Part II-A relative to the biotic environment were:

1. Are species presently recognized by Federal and/or State agencies as rare, threatened or endangered affected by an action or alternative?

2. Are there any unique biotic areas or communities affected by an action or alternative?

3. Are there any on-going game/wildlife programs affected by an action or alternative?

4. Are there any expected episodes of air/water pollution that might lead to chronic effects on established biota?

Negative answers to all of the above would result in an assessment of no significant negative impact. In the case of a base closure, and thereby the elimination of the existing negative impact, an assessment of beneficial impact would result.

UTILITIES (AFERN 4.4.2)

The probable impact on utility systems is related to the number of personnel and aircraft, and the activity increases or decreases to a particular base and region. A relative figure of impact can be calculated using the percentage increase/decrease of personnel, and considering the availability and limitations of utilities. An increase in personnel is considered insignificant if the existing utility systems could accomodate the increased demand, and is considered unfavorable if utilities are limited and could be overtaxed.

RADIOACTIVE BURIAL SITES (AFERN 4.4.3.7.1)

Radioactive burial sites were located utilizing the Tab A-1. At each base that has a site the location is given in the Tab A-1.

ELECTROMAGNETIC RADIATION HAZARD AREAS (AFERN 4.4.3.7.2)

All radiation hazard areas are non-permanent and controlled. There would be no residual hazard once the operation ceases. Electromagnetic radiation hazard areas are normally associated with radar operation and maintenance and non-destructive inspection.

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

Assessment of potential impact on sites of historical and/or archeological significance was approached from the standpoint of answering the following questions:

1. Are there any historical/archeological sites on the installation?

2. Are there any such sites within a 10-mile radius of the installation?

3. Is there any programmed construction or other physical modification of the environment required by the actions/alternatives and, if so, would the construction/modification be in close proximity to such sites?

In the absence of historical/archeological sites or whenever sites were present but unaffected by actions/alternatives, an assessment of no impact was reached. If actions/alternatives suggest a possible impact, the degree of impact is discussed in detail on a case by case basis.

D. PROJECT PERSONNEL

All project personnel currently are assigned to either USAF Environmental Health Laboratory, Kelly AFB TX or USAF Environmental Health Laboratory, McClellan AFB CA and serve as professional consultants to Air Force and other Federal Agencies on items of environmental concern in their respective areas of expertise. Biographical sketches for each individual follow.

NAME: Merrill R. Good, Major, USAF, BSC

PROFESSION: Staff Bioenvironmental Engineer

TITLE: Chief, Special Projects Division
USAF Environmental Health Laboratory

ADDRESS: USAF Environmental Health Laboratory
Kelly AFB TX 78241

EDUCATION: University of Arkansas, Fayetteville, Ark, B.S.Ch.E., 1960
Air Command and Staff College, Maxwell AFB, Ala, 1974

PUBLICATIONS:

Good, Major Merrill R. "A General Plan for Environmental Pollution Abatement." Unpublished Air Command and Staff College research study, Air University, Maxwell AFB, Alabama, 1974.

Good, Major Merrill R.; Vermulen, Captain Erik K.; and Smith, John W. "Technical Report on Waste Discharge to Ocean Waters Vandenberg AFB, California." Unpublished technical report, Vandenberg AFB, California, January 1973.

Good, Captain Merrill R. and Woodmansee, Lt Colonel Terrell R. "Bio-Environmental Engineering Report for Beryllium Demonstration Motor Static Firing at Janet Island, Eniwetok Atoll, Marshall Islands on 23 April 1968." SAMSO TR-68-287, Space & Missile Systems Organization, Los Angeles AFS, California, July 1968.

Good, Captain Merrill R. "Procedures for the Analysis, Treatment and Disposal of Aerozine-50 in Water at Titan II Missile Complexes." Unpublished Aerospace Power Study, Squadron Officer School, Maxwell AFB, Alabama, March 1966.

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

American Institute of Chemical Engineers
American Chemical Society
American Industrial Hygiene Association
American Conference of Governmental Industrial Hygienists

EXPERIENCE:

January 1976 - Present

Staff Bioenvironmental Engineer and Chief, Special Projects Division, USAF Environmental Health Laboratory, Kelly AFB, TX. Conducts and manages projects concerned with environmental pollution abatement and control, pesticide management and control, toxicology, and industrial hygiene engineering.

June 1974 - January 1976

Chief, Biomedical Systems Branch, USAF School of Aerospace Medicine, Brooks AFB, TX. Managed the research and development program for evaluation of aeromedical equipment and systems for use in USAF aeromedical airlift.

August 1973 - June 1974

Student, Air Command and Staff College, Air University, Maxwell AFB, Alabama. Research study was on development of an effective environmental pollution abatement control program.

January 1971 - August 1973

Chief, Bioenvironmental Engineering Services, Vandenberg AFB, CA. Supervised an extensive base program involved with environmental protection, industrial hygiene, toxicology, and health physics. Special emphasis was placed on the application of these programs to the Air Force missile test program; specifically, air and water pollution control of toxic missile propellants and exhaust products. A comprehensive environmental pollution abatement and control program was developed for the base.

January 1969 - January 1971

Chief, Bioenvironmental Engineering Services, USAF Hospital Clark Air Base, Republic of the Philippines. Supervised a comprehensive military public health and industrial hygiene engineering program.

September 1966 - January 1969

Staff Bioenvironmental Engineer, USAF Space and Missile Systems Organization, Los Angeles, California. Consultant to all space and ballistic missile research and development programs.

June 1964 - September 1966

Bioenvironmental Engineer, 381 Strategic Missile Wing (Titan II), McConnell AFB, KS. Consultant to Wing Commander on toxicity of missile propellants. Performed extensive noise and acoustic surveys of the Missile Combat Crew Control Center.

October 1960 - June 1964

Sanitary and Industrial Hygiene Engineer, Wurtsmith AFB, MI. Supervised the base public health, sanitary, and industrial hygiene engineering program. Participated in wet test validation study of Titan II missile system at McConnell AFB, KS from October 1962 to January 1963.

August 1960 - October 1960

Student, "Military Aspects of Sanitary and Industrial Hygiene Engineering," USAF Medical Service School, Gunter AFB, Alabama.

June 1960 - August 1960

Process Engineer, Philblack Plant, Phillips Chemical Company, Borger, TX.

NAME: John J. Gokelman, Major, USAF, BSC

PROFESSION: Consulting Bioenvironmental Engineer

TITLE: Chief, Environmental Protection Engineering Division

EDUCATION:

Manhattan College, New York NY, B.C.E., 1959
University of Pittsburgh, Pittsburgh PA, M.S.I.H., 1964
University of Michigan, Ann Arbor MI, H.S.I.H., 1970

PUBLICATIONS:

Journals

Clarke, N.P.; W.M. Wolfe, J.J. Gokelman, H.E. von Gierke, "Simulation of Aerospace Flight Acceleration and Dynamic Pressure Environments for Biodynamics Research," Journal of Spacecraft and Rockets. 4 June 1967.

Professional Reports

Gokelman, J.J.; "Industrial Hygiene Survey - Sumpter Smith, ANG Base, Birmingham AL," Prof. Report 72M-18, USAFEHL, McClellan AFB CA 95652.

Gokelman, J.J.; "Industrial Hygiene and Air Pollution Evaluation of Pacer Foam Operations," Prof. Report 73M-5, USAFEHL, McClellan AFB CA 95652.

Gokelman, J.J.; "Emissions Study, Plattsburgh AFB NY," Prof. Report 75M-13, USAFEHL, McClellan AFB CA 95652.

Gokelman, J.J.; E.C. Banner, "Investigation of OSHA Complaint, Hill AFB UT," Prof. Report 75M-14, USAFEHL, McClellan AFB CA 95652.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Diplomate - American Board of Industrial Hygiene
Member, Air Pollution Control Association
Member, American Industrial Hygiene Association

CERTIFICATIONS/REGISTRATIONS

Certified Industrial Hygienist, Comprehensive Practice, American Board of Industrial Hygiene

Registered Profession Engineer, Civil Engineering, State of California

Certified Safety Professional, Board of Certified Safety Professionals

EXPERIENCE

1972 - Present

Chief, Environmental Protection Engineering Division, USAF Environmental Health Laboratory, McClellan AFB CA. Supervise the operation of the Air Pollution field operations of the Laboratory.

1968 - 1971

AFIT, Graduate School, University of Michigan

1967 - 1968

Chief, Military Public Health Servicies, Cam Ranh Bay AFB, Vietnam

1964 - 1967

Bioenvironmental Engineer, Vibration and Impact Branch, 6570 AMRL, Wright-Patterson AFB OH

1963 - 1964

AFIT, Graduate School, University of Pittsburgh

1960 - 1963

Bioenvironmental Engineer, 851 Medical Group, Malmstrom AFB MT

NAME: John H. Pontier, Capt, USAF, BSC

PROFESSION: Sanitary Engineer

TITLE: Consulting Bioenvironmental Engineer

ADDRESS: USAF Environmental Health Laboratory, Kelly AFB TX 78241

EDUCATION: Grove City College, Pennsylvania - B.S. 1968
University of Oklahoma, Norman, Oklahoma - M.S. 1974

PUBLICATIONS:

None

PROFESSIONAL CERTIFICATION:

Professional Engineer, State of Texas, No. 38974

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

Member, National Society of Professional Engineers
Member, Texas Society of Professional Engineers

EXPERIENCE:

1975 to Present

Consulting Bioenvironmental Engineer (Sanitary), USAF Environmental Health Laboratory, Kelly AFB TX. Conduct and consult water pollution control surveys and studies. Prepared Environmental Impact Report, Proposed Relocation of Air Force Systems Command (AFSC).

1974 - 1975

Chief, Environmental Health Services, Udorn RTAFB, Thailand. Planned and implemented programs for environmental protection, industrial hygiene and public health. Performed sanitary engineering consultation. Supervised three environmental health technicians.

1972 - 1974

Graduate School, University of Oklahoma. Received M.S. degree in Civil Engineering. Research was a study of the effect of land use and water use on lake water quality.

1968 - 1972

Bioenvironmental Engineer, Keesler AFB MS. Planned, implemented and performed environmental protection, occupational health and public health surveys and studies. Supervised seven military public health and occupational medicine technicians.

1964 - 1968

Grove City College, Pennsylvania. Received B.S. degree in Mechanical Engineering.

NAME: Jerry T. Lang, Captain, USAF, BSC

PROFESSION: Medical Entomologist

TITLE: Consulting Environmental Entomologist

ADDRESS: USAF Environmental Health Laboratory
Kelly AFB TX 78241

EDUCATION: B.S., Zoology, Miami University, 1968
M.S., Entomology, The Ohio State University, 1970
Ph.D., Entomology, The Ohio State University, 1975

PUBLICATIONS:

Periodicals

Lang, J.T. and Treece, R.E. 1971. Sterility and longevity effects of Sterculia foetida oil on the face fly. J. Econ. Entomol. 64(2):455-457.

Lang, J.T. and Treece, R.E. 1972. Boric acid effects on face fly fecundity. J. Econ. Entomol. 65(3):741-746.

Lang, J.T. 1973. A preliminary study of the aquatic Diptera and other insects of Woodend Pond. Atlantic Naturalist 28(3):93-98.

Lang, J.T. and Foster, W.A. Is there a female sex pheromone in the mosquito, Culiseta inornata? Submitted for review.

Lang, J.T. and Foster, W.A. Contact sex pheromone in Culiseta inornata (Diptera: Culicidae). Submitted for review.

Theses

The effects of X-radiation and two chemosterilants on the face fly, Musca autumnalis (Diptera: Muscidae). M.S.

Contact sex pheromone in the mating behavior of Culiseta inornata. Ph.D.

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Entomological Society of America
American Mosquito Control Association
Animal Behavior Society
American Association for the Advancement of Science

PROFESSIONAL EXPERIENCE:

November 1975 - Present

Consulting Environmental Entomologist, USAF Environmental Health Laboratory, Kelly AFB TX.

September 1973 - November 1975

Graduate Research, Air Force Institute of Technology, The Ohio State University.

April 1970 - August 1973

Air Force Representative, Military Entomology Information Service.

PROFESSIONAL CERTIFICATION:

Registered Medical Entomologist, American Registry of Professional Entomologists.

HONORS AND AWARDS:

Research Assistantship, The Ohio State University, 1968-1970.

Joint Service Commendation Medal, 1974.

RESEARCH:

Muscoid fly control (in particular concerning the face fly) through use of the sterile male technique. Approach to this aspect of entomological research was to evaluate X-radiation and two unconventional and environmentally safe chemosterilants. A general and descriptive faunal study was conducted on the Diptera of a pond used in environmental education classes by the Audubon Naturalists Society of Washington, D.C. Recently interest has been directed towards pheromone production and other aspects of epigamic behavior in mosquitoes.

NAME: James Thomas Goodwin

DATE OF BIRTH: 25 November 1938

FAMILY STATUS: Married; two children

EDUCATION: B.S., Biology, Memphis State University, 1964
M.S., Entomology, University of Tennessee, 1965

Ph.D., Entomology, University of Tennessee, 1967

RESEARCH: Research efforts, including graduate studies, have been principally devoted to studies of the Tabanidae with special emphasis on the juvenile stages of eastern Nearctic fauna. Recently interest has shifted to the Neotropical fauna. Other research has centered on the fauna of Tennessee (Orthoptera, Odonata) and on the distribution and juvenile taxonomy of the Megaloptera of the eastern Nearctic.

PRIOR RESEARCH SUPPORT:

1. Non-service Fellowship from University of Tennessee, 1966-67.

2. Memphis State University Faculty Research Grant, 1968-69.

3. Same as 2, 1969-70.

4. Same as 2, 1970-71.

PROFESSIONAL EXPERIENCE:

1. Memphis State University, Memphis, Tennessee
   Associate Professor of Biology
   September, 1967 - May, 1974

2. U. S. Air Force
   Medical Entomologist
   June, 1974 - Present

PROFESSIONAL SOCIETIES:

1. Entomological Society of America
2. Georgia Entomological Society
3. Tennessee Academy of Science
4. Tennessee Entomological Society
5. American Mosquito Control Association
6. Florida Entomological Society

PUBLICATIONS (PERIODICALS):

1. An annotated list of the Tabanidae of Tennessee. J. Tennessee Acad. Sci. 41:114-115. 1966.

2. Additions to the list of Odonata from Tennessee. J. Tennessee Acad. Sci. 43:27. 1968.

3. The Gryllotalpidae and Tridactylidae (Orthoptera) of Tennessee. J. Tennessee Acad. Sci. 43:28-29. 1968.

4. Notes on the parasites of immature Tabanidae (Diptera) and descriptions of the larva and puparium of Carinosillus pravus (Diptera; Tachinidae). J. Tennessee Acad. Sci. 43:107-109. 1968.

5. The Tettigoniidae (Orthoptera) of Tennessee. J. Tennessee Acad. Sci. 44:76-84. 1969.

6. A range extension for the Mormon cricket. Anabrus simplex. Ann. Entomol. Soc. Amer. 63:623-624. 1970.

7. Notes on the biology of Merycomyia whitneyi (Diptera; Tabanidae) in South Carolina. Ann. Entomol. Soc. Amer. 64:1182-1183. 1971.

8. Immature stages of some eastern Nearctic Tabanidae (Diptera). I. Introduction and the genus Chrysops Meigen. J. Georgia Entomol. Soc. 7:98-109. 1972.

9. Immature stages of some eastern Nearctic Tabanidae (Diptera). 1973. II. The tribe Diachlorini. J. Georgia Entomol. Soc. 8:5-11.

10. Immature stage of some eastern Nearctic Tabanidae (Diptera). 1973. III. The genus Tabanus Linnaeus. J. Georgia Entomol. Soc. 8:82-89.

11. Immature stages of some eastern Nearctic Tabanidae (Diptera). 1973. IV. The genus Merycomyia. J. Tennessee Acad. Sci. 48:115-118.

12. A study of some immature Neotropical Tabanidae (Diptera). 1974. Ann. Entomol. Soc. Amer. 67:85-133.

13. Immature stages of some eastern Nearctic Tabanidae (Diptera). V. Stenotabanus (Aegialomyia) magnicallus (Stone). 1974 J. Tennessee Acad. Sci. 49:14-15.

14. The male of Tabanus exilipalpis (Diptera, Tabanidae) and brief notes on the female. 1974. Ann. Entomol. Soc. Amer. 67:295.

15. Notes on some "rare" eastern Nearctic Tabanidae (Diptera); state records and host-parasite relationship for other species. Florida Ent. IN PRESS.

16. Immature stages of some eastern Nearctic Tabanidae (Diptera). VI. Haematopota Meigen and Whitneyomyia Bequaert, plus other Tabanini. IN PRESS.

17. Immature stages of some eastern Nearctic Tabanidae (Diptera). VII. Additional species of Chrysops Meigen. IN PRESS.

18. Notes on the pupae of some Ethiopian species of Tabanidae (Diptera). Ann. Entomol. Soc. Amer. 69:311-316. 1976

19. Insects of the Phoenix Islands, Pacific Ocean. Submitted for review.

PUBLICATIONS (OTHER):

1. Laboratory Exercises in General Animal Biology. 1974 Burgess Publishing Company, Minneapolis, MN. xi + 185 pp. (Co-authored with James F. Payne).

TECHNICAL REPORTS:

1. The Effect of Ultra Low Volume Aerial Dispersal of Naled on an Aquatic Habitat, Robins AFB GA. USAF Environmental Health Lab, Kelly AFB TX. EHL(K) 74-25, October 1974.

2. Pesticide Analysis for Naled Robins AFB GA Aerial Spray. USAF Environmental Health Lab, Kelly AFB TX. Supplement of EHL(K) 74-25, December 1974.

3. Engineering and Biological Evaluation of Wastewater Treatment Practices at Reese AFB TX. USAF Environmental Health Lab, Kelly AFB TX. EHL(K) 76-3, April 1976.

ENVIRONMENTAL REPORTS:

1. Proposed Realignment of Air Force Communications Service and Related Missions. Vol. I. Richards-Gebaur AFB MD.
2. Ibid. Vol. II. Scott AFB IL.
3. Ibid. Vol. III. Pope AFB NC.
4. Ibid. Vol. IV. Tinker AFB OK.

NAME: Jerry W. Jackson, Capt, USAF, BSC

PROFESSION: Consulting Bioenvironmental Engineer, Air Quality and Industrial Hygiene.

TITLE: Chief, Special Studies Branch, Environmental Protection Engineering Division.

ADDRESS: USAF Environmental Health Laboratory, McClellan AFB CA 95652

EDUCATION:

University of Arizona, Tucson AZ, B.S.C.E., 1968.
University of Texas, Austin TX, M.S.E.H.E. Candidate 1976.

PUBLICATIONS:

Journals

Thomas, T.C.; Jackson, J.W.: "A Technique for Sampling 2,4-D; 2,4,5-T Herbicides from Air," Accepted for Publication, Bull. Environ. Contam. and Toxicol., 1975.

Professional Reports

Thomas, T.C.; Jackson, J.W.; "An Evaluation of a Commerical Instrument for Chlordane and Hepthchlor Sampling." Prof. Report 75M-12, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W. et al, "Effects on Emissions of Particulates, Hydrocarbons, Nitrogen Oxides, Lead and Iron Using Waste POL as a Supplement to Heating Plant Fuel," Prof. Report USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; Normington, W.E.; "An Environmental Evaluation of Acid Scrubbers," Prof. Report 75M-11, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; "An Evaluation of Potential Hazards to Ground Crew from Exposure to Engine Starter Cartridge Combustion Products," Prof. Report 75M-3, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; "Emissions Study, Wright-Patterson AFB OH," Prof. Report 74M-14, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; Normington, W.E.; "Emissions Study, Lowry AFB CO," Prof. Report 74M-16, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; "Emissions Study, USAF Academy," Prof. Report 74M-11, USAFEHL, McClellan AFB CA 95652.

Jackson, J.W.; "Emissions Study, Langley AFB VA," Prof. Report 73M-8, USAFEHL, McClellan AFB CA 95652.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

Diplomate - American Board of Industrial Hygiene.
Member, Air Pollution Control Association.
Member, California Society of Professional Engineers.

CERTIFICATIONS/REGISTRATIONS:

Certified Industrial Hygienist, Comprehensive Practice, American Board of Industrial Hygiene.

Registered Professional Engineer, Civil Engineering, State of California.

EXPERIENCE:

Chief, Special Studies Branch, Environmental Protection Engineering Division, USAF Environmental Health Laboratory, McClellan AFB CA. Develop and apply sampling and analytical methods for unique requirements in the field of air pollution and industrial hygiene.

1972 - 1973

AFIT, Graduate School, University of Texas. Course work completed and thesis in draft. Anticipate degree M.S.E.H.E. in June 1976. Masters research was a study of neutron activation analysis for trace metals in coal-fired power plant exhausts.

1969 - 1972

Chief, Bioenvironmental Engineering Services, Nellis AFB NV. Conducted industrial hygiene surveys of base industrial activities. Supervised an occupational health program, sanitation program, public health program and provided consultation to the Base Commander and Base Civil Engineer in matters relating to the bioenvironmental aspects of construction and operations.

1968 - 1969

Student, Bioenvironmental Engineering Course, School of Aerospace Medicine, Brooks AFB TX.

1966 - 1968

AFIT, Student, University of Arizona, School of Civil Engineering. Received a B.S. in Civil Engineering, 1968.

1960 - 1966

Enlisted, USAF, Medical Administrative Specialist.

NAME: William D. Christensen, Capt, USAF, BSC

PROFESSION: Industrial Hygienist

TITLE: Consulting Bioenvironmental Engineer

ADDRESS: USAF Environmental Health Laboratory,
McClellan AFB CA 95652

EDUCATION:

Lowell Technological Institute, Lowell MA., B.S. 1968.
University of Pittsburgh, Pittsburgh PA., M.S. 1974.

PUBLICATIONS: None

PROFESSIONAL CERTIFICATION:

Comprehensive Practice, Industrial Hygiene,
American Board of Industrial Hygiene.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Conference of Government Industrial Hygienists
American Industrial Hygiene Association
American Academy of Industrial Hygienists
Diplomate, American Board of Industrial Hygiene

EXPERIENCE:

1975 - Present

USAF Environmental Health Laboratory, McClellan AFB CA. Provide consultant engineering servicies in air pollution evaluation and control techniques and in industrial hygiene.

1974 - 1975

Chief, Environmental Health Services. Responsible for the management of the public health department including: occupational health, environmental pollution, and communicable diseases. Review technical drawings and provide recommendations to insure compliance with applicable health standards. Conduct surveys of chemical and physical hazards found in the industrial shops and surveys of potential air and water pollution sources. Evaluate survey results and consult with designers on possible engineering corrective measures. USAF Hospital, Korat AB Thailand.

1973 - 1974

University of Pittsburgh, Graduate School of Public Health, Pittsburgh PA. Master of Science Degree, Hygiene, 1974. Thesis: Size Selective Characteristics of Circular Inlets As A Function of Probe Bluntness and Sampling Velocity.

1968 - 1973

Bioenvironmental Engineer. Applied knowledge of engineering and biological sciences for health protection purposes. Conducted surveys and performed measurments to recognize chemical, physical and biological stress factors capable of producing sickness or impaired health in either the community or occupational environment. Management of environmental health programs. Supervised medical personnel and activities in environmental quality, occupational safety and health and public health matters. Established and maintained liaison with local, state, and federal agencies on matters involving criteria standards, performance specifications, and monitoring related to environmental quality and occupational health concerns. USAF Hospital, Hill AFB UT, and USAF Hospital, Plattsburgh AFB NY.

1964 - 1968

Lowell Technological Institute, Lowell MA. Bachelor of Science Degree in Chemical/Paper Engineering.

NAME: Edwin C. Banner III, Capt, USAF, BSC

PROFESSION: Industrial Hygienist, Environmental Engineer

TITLE: Consulting Bioenvironmental Engineer,
USAF Environmental Health Laboratory,
McClellan AFB CA 95652

EDUCATION:

Virginia Polytechnic Institute, Blacksburg VA, B.S., 1964.
Clemson University, Clemson SC, M.S., 1970.

PUBLICATIONS: None

PROFESSIONAL CERTIFICATION:

Engineering Aspects, Industrial Hygiene,
American Board of Industrial Hygiene.

Professional Engineer, State of Texas, No. 36573.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Industrial Hygiene Association.
American Conference of Governmental Industrial Hygienists.
American Academy of Industrial Hygienists.
Diplomate, American Board of Industrial Hygiene.

EXPERIENCE:

1975 - Present

Consulting Bioenvironmental Engineer, USAF Environmental Health Laboratory, McClellan AFB CA.

1972 - 1975

Bioenvironmental Engineer Instructor, USAF School of Aerospace Medicine, Brooks AFB TX.

1970 - 1972

Staff Bioenvironmental Engineer, Defense Intelligence Agency, Washington DC.

1969 - 1970

Master of science, Environmental Systems Engineering, Clemson University, Clemson SC.

1968 - 1969

Base Bioenvironmental Engineer, Andrews AFB MC.

1967 - 1968

Base Bioenvironmental Engineer, Korat AB, Thailand.

1965 - 1967

Base Bioenvironmental Engineer, Wurtsmith AFB MI.

II. COMPARATIVE ANALYSES OF PROBABLE IMPACTS OF PROPOSED ACTIONS AND VIABLE ALTERNATIVES

A. SUMMARY

1. Kincheloe AFB MI

EARTH (AFERN 3.1)

Neither of the alternatives should generate adverse effects or significantly alter the fundamental physiographic, geological and soil characteristics and properties of the area. Surface and subsurface conditions should not be changed since construction projects are not involved under either alternative. The solid waste or refuse generated should decrease under the proposed action. The overall effect of this reduction should be minimal, and the useful life of sanitary landfills in the area should be extended slightly under the proposed action.

WATER (AFERN 3.2)

A decrease in water consumption and wastewater discharges on-base and in the civilian community is probable. The following reductions in water and wastewater flows should be expected.

TABLE 1. ESTIMATED REDUCTION OF WATER/WASTEWATER FLOWS

	PROPOSED	ALTERNATIVE 1	ALTERNATIVE 2
WATER DEMAND (On-Base)	0.80 mgd	NO CHANGE	NO CHANGE
WATER DEMAND (Off-Base)	0.56 mgd		
WASTEWATER DEMAND (On-Base)	0.65 mgd		
WASTEWATER DEMAND (Off-Base)	0.37 mgd		

In summary, the effect on water quality should be favorable under the proposed action, and unchanged under the alternatives.

AIR (AFERN 3.3)

A decrease in air pollutant emissions both on-base and off-base is probable. The following air pollutant emissions should be expected on-base.

TABLE 2. ESTIMATED AIR POLLUTANT EMISSIONS

POLLUTANT	EMISSIONS (TONS/YEAR) PRESENT	PROPOSED	ALTERNATIVE 1	ALTERNATIVE 2
Particulate	320	0	NO CHANGE	NO CHANGE
SO_x	516	0		
NO_x	237	0		
HC	448	0		
CO	937	0		

The off-base emissions attributable to the anthropogenic activities of base personnel will also decrease but is impossible to quantify accurately.

BIOTIC ENVIRONMENT (AFERN 3.4)

No significant negative impact is expected as a result of closure of Kincheloe AFB (Proposed Action). To the contrary, this action is expected to exert a beneficial impact on the biota. Alternative 1 or 2 would result in no change at Kincheloe AFB.

UTILITIES (AFERN 4.2.2)

Implementation of the proposed action should decrease utility demands in the region by approximately 21%. Implementation of Alternative 1 or 2 will not change demands. No adverse impact is expected in any case.

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

No impact on sites of historical/archeological significance is expected.

2. Wurtsmith AFB MI

EARTH (AFERN 3.1)

Neither of the alternatives should generate adverse effects or significantly alter the fundamental physiographic, geological and soil characteristics and properties of the area. Surface and subsurface conditions should not be changed since construction projects are not involved under either alternative. The solid waste or refuse generated should decrease under Alternative 1. The overall effect of this reduction should be minimal, and the useful life of sanitary landfills in the area should be extended slightly under Alternative 1.

WATER (AFERN 3.2)

A decrease in water consumption and wastewater discharges on-base and in the civilian community is probable. The following reductions in water and wastewater flows should be expected.

TABLE 3. ESTIMATED REDUCTIONS OF WATER/WASTEWATER FLOWS

	PROPOSED	ALTERNATIVE 1	ALTERNATIVE 2
WATER DEMAND (On-Base)	NO CHANGE	0.97 mgd	NO CHANGE
WATER DEMAND (Off-Base)		0.31 mgd	
WASTEWATER DEMAND (On-Base)		0.06 mgd	
WASTEWATER DEMAND (Off-Base)		0.21 mgd	

In summary, the effect on water quality should be unchanged unless Alternative 1 is implemented, in which case the effect should be favorable.

AIR (AFERN 3.3)

A decrease in air pollutant emissions both on-base and off-base is probable. The following air pollutant emissions should be expected on-base.

TABLE 4. ESTIMATED AIR POLLUTANT EMISSIONS

POLLUTANT	EMISSIONS (TONS/YEAR)			
	PRESENT	PROPOSED	ALTERNATIVE 1	ALTERNATIVE 2
Particulate	27	NO CHANGE	0	NO CHANGE
SO_x	305		0	
NO_x	231		0	
HC	277		0	
CO	1819		0	

The off-base emissions attributable to the human activities of base personnel will also decrease but is impossible to quantify accurately.

BIOTIC ENVIRONMENT (AFERN 3.4)

No significant negative impact is expected as a result of closure of Wurtsmith AFB (Alternative 1). To the contrary, this action is expected to exert a beneficial impact on the biota. The proposed action or alternative 2 would result in no change at Wurtsmith AFB.

UTILITIES (AFERN 4.4.2)

Implementation of Alternative 1 should decrease utility demands in Iosco County by approximately 38%. Implementation of the proposed action or Alternative 3 will not change demands. No adverse impact is expected in any case.

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

No impact on sites of historical/archeological significance is expected to result from closure of Wurtsmith AFB (Alternative 1). The proposed action or Alternative 2 would result in no change at Wurtsmith AFB.

B. IMPACT ANALYSIS

1. Proposed Action:

a. Kincheloe

EARTH (AFERN 3.1)

None of the alternatives should generate significant adverse effects, nor alter the fundamental physiographic, geological, and soil characteristics and properties of the area. While the soil consists primarily of poorly graded sand, subject to erosion when disturbed, it is sufficiently fertile to support adequate vegetal cover, and has been managed to maintain such cover. Allowing it to revert to a natural state may actually enhance erosion protection. Surface and subsurface conditions should remain unchanged since construction projects are not involved under any alternative. Solid waste and/or refuse generated should decrease. The overall effect should be minimal, and the useful life of sanitary landfills in the area should be extended.

WATER (AFERN 3.2)

A decrease in demand on water supplies and a decrease in discharges of wastewaters on-base and in the civilian community is anticipated. The decreases on-base will result directly from the decrease in employee population, and the decreases in the civilian communities will result from the decrease in families residing in the area. Decreased demands caused by decreased industrial activity will be negligible.

Consumption of potable water is assumed at 150 gpcd for residents and 50 gpcd for nonresident base employees. The demand on-base will decrease by approximately 0.80 mgd (the current usage). The reduced demand in the civilian community should be 0.56 mgd. [(150 gpcd)(700 military + 467 civilians)(3.2 family members)].

Allowing 100 gpcd of domestic wastewater for residents and 30 gpcd for nonresidents, a decrease of 0.65 mgd is expected on-base and 0.37 mgd in the civilian community.

The effect of decreased demands on water supplies and decreased demands on effluent receiving waters should be favorable.

AIR (AFERN 3.3)

A decrease in air pollutant emissions on-base and in the civilian community is anticipated. The decreases on-base will result directly from the decrease in aircraft operational activity and associated decreases in maintenance and human activities. The current emission inventory for Kincheloe AFB is included, Table 5. Since Chippewa County is predominately state and national forest areas, and recreation and resort areas no county emission inventory has been performed. However, Kincheloe AFB is an industrial area and would therefore contribute a large percentage to the total county anthropogenic air pollutant emissions.

BIOTIC ENVIRONMENT (AFERN 3.4)

Closure of Kincheloe AFB, once initiated, can be accomplished in a relatively short timespan. However, the activities required to accomplish closure will differ from those of the normal operational routine. Should the degree of difference be great, a short-term negative impact on the biota might occur, but the degree of such impact should be very slight, and biotic recovery, if impact does occur, should be accomplished within a few months.

At Kincheloe AFB, there are no major game or wildlife programs in being. Although there are approximately 4000 acres of woodland, this acreage in comparison with the surrounding area is not unique. Furthermore, there are no records of occurrence for any rare, threatened or endangered species on base property.

Following closure, the absence of human activities and concomitant episodes of air and water pollution and episodes of habitat modification should produce a beneficial impact on the biotic environment.

UTILITIES (AFERN 4.4.2)

The decrease in personnel and activities at Kincheloe AFB will result in a decrease in demand for potable water and sewage treatment. Since utility consumption is directly proportional to an area's population, reduction in the population can be directly translated to decreased utility demand in the local community. Projected population decreases under this alternative are 21% in the region.

Aircraft fuel consumption, AGE fuel consumption, and electricity consumption are all expected to decrease at Kincheloe AFB as a result of decreases in the number of aircraft and personnel. Since existing structures will be vacated, the base heating and cooling load, and natural gas, coal and fuel oil consumption are expected to decrease significantly. Consumption of coal should decrease by 17,582 ton/yr, natural gas by 294 mcf/yr, fuel oil by 425,000 gal/yr. The impact should be favorable.

TABLE 5

EMISSIONS INVENTORY
Kincheloe AFB

Source Category	Emission (Tons/Year) Part.	SO_x	NO_x	HC	CO
I. Transportation					
A. Road Vehicles	1	-	9	44	452
B. Aircraft	8.7	8.9	46.3	218.6	258.8
C. Other	1.2	1.8	21.5	13.4	116.4
SUBTOTAL	10.9	10.7	67.8	232.0	827.2
II. Fuel Combustion					
A. Industry	274	501	132	9	18
B. Commercial/ Institutional	3	3	13	1	1
C. Residential	1.5	1	15	1	3
SUBTOTAL	278.5	505	160	11	22
III. Incineration	0	0	0	0	0
IV. Process	0	0	0	0	0
V. Evaporation and Miscellaneous	30.2	.6	.6	161.4	88.2
TOTAL	319.6	516.4	237.4	448.4	937.4

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

There are no sites of historical/archeological significance on Kincheloe AFB or within a 10-mile radius of the base.

b. Wurtsmith AFB MI

The proposed action would result in no change at Wurtsmith AFB.

2. Alternative 1

a. Kincheloe AFB, MI

This alternative action would result in no change at Kincheloe AFB.

b. Wurtsmith AFB, MI

EARTH (AFERN 3.1)

None of the alternatives should generate significant adverse effects, nor alter the fundamental physiographic, geological, and soil characteristics and properties of the area. While the soil consists primarily of poorly graded sand, subject to erosion when disturbed, it is sufficiently fertile to support adequate vegetal cover, and has been managed to maintain such cover. Allowing it to revert to a natural state may actually enhance erosion protection. Surface and subsurface conditions should remain unchanged since construction projects are not involved under any alternative. Solid waste and/or refuse generated should decrease. The overall effect should be minimal, and the useful life of sanitary landfills in the area should be extended.

WATER (AFERN 3.2)

A decrease in demand on water supplies and a decrease in discharges of wastewaters on-base and in the civilian community is anticipated. The decreases on-base will result directly from the decrease in employee population, and the decreases in the civilian communities will result from the decrease in families residing in the area. Decreased demands caused by decreased industrial activity will be negligible.

Consumption of potable water is assumed at 150 gpcd for residents and 50 gpcd for nonresident base employees. The demand on-base will decrease by approximately 0.97 mgd (current usage). The decreased demand in the civilian community should be 0.31 mgd [(150 gpcd)(654 families)(3.2 family members)].

Allowing 100 gpcd of domestic wastewater for residents and 30 gpcd for nonresidents, a decrease of 0.06 mgd is expected on-base and 0.21 mgd in the civilian community.

The effect of decreased demands on water supplies and water quality should be favorable.

AIR (AFERN 3.3)

A decrease in air pollutant emissions on-base and in the civilian community is anticipated. The decreases on-base will result directly from the decrease in aircraft operational activity and associated decreases in maintenance and human activities. The current emission inventory for Wurtsmith AFB is included, Table 6. Since Iosco County is predominately state and national forest areas, and recreation and resort areas no county emission inventory has been performed. However, Wurtsmith AFB is an industrial area and would therefore contribute a large percentage to the total county anthropogenic air pollutant emissions.

BIOTIC ENVIRONMENT (AFERN 3.4)

Closure of Wurtsmith AFB, once initiated, can be accomplished in a relatively short timespan. However, the activities required to accomplish closure will differ from those of a normal operational routine. Should the degree of difference be great, a short-term negative impact on the biota might occur, but the degree of such impact should be very slight, and biotic recovery, if impact does occur, should be accomplished within a few months.

At Wurtsmith AFB, no on-going game or wildlife programs are in operation. Some 2,433 acres of unimproved land are present; this acreage is predominantly grassland except for about 290 acres of pine forest. In comparison to the surrounding region, no unique habitat is included in the above acreage. No rare, threatened or endangered species is known to occur on base, except as possible transients (the bald eagle is known to occur in National Forests of the region).

Following closure, the absence of human activities and concomitant episodes of air and water pollution and episodes of habitat modification should produce a beneficial impact on the biotic environment.

UTILITIES (AFERN 4.4.2)

The decrease in personnel and activities at Wurtsmith AFB will result in a decrease in demand for potable water and sewage treatment. Since utility consumption is directly proportional to an area's population, reduction in the population can be directly translated to decreased utility demand in the local community. Projected population decreases under this alternative are 38% in Iosco County.

Aircraft fuel consumption, AGE fuel consumption, and electricity consumption are all expected to decrease at Wurtsmith AFB as a result of decreases in the number of aircraft and personnel. Since existing structures will be vacated, the base heating and cooling load, and fuel oil consumption are expected to decrease significantly. The effect of decreased utility demands should be favorable.

TABLE 6.

EMISSIONS INVENTORY
Wurtsmith AFB

Source Category	Emission (Tons/Year) Part.	SO_x	NO_x	HC	CO
I. Transportation	9.5	7.4	90.8	159	1815.1
II. Fuel Combustion					
A. Industry	10	258.6	131.4	2.5	1
B. Commercial/ Institutional	7.7	13.9	9.2	2.4	3.8
SUBTOTAL	17.7	272.5	140.6	4.9	4.8
III. Incineration	< 1	< 1	< 1	< 1	< 1
IV. Process	-	-	-	-	-
V. Evaporation and Miscellaneous	-	-	-	113.6	-
TOTAL	27	305	231	277	1819

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

There are no sites of historical/archeological significance on Wurtsmith AFB. Approximately five miles from the base are found the old Indian Mission Church and Cemetery. However, since the activities required to accomplish base closure will be essentially restricted to the base proper, there should be no impact on off-base sites.

3. Alternative 2

This alternative results in no action. Consequently, existing conditions at Kincheloe AFB and Wurtsmith AFB would continue.

III. OTHER CATEGORIES

A. The Irreversible and Irretrievable Commitments of Resources:

The proposed action will result in the commitment of labor, material and energy resources devoted to the relocation effort which are considered to be irretrievably committed.

B. Unavoidable Adverse Effects and Mitigation Possibilities:

There are no known unavoidable adverse effects and mitigation possibilities.

C. Details of Unresolved Issues:

There are no known unresolved issues at this time.

D. Bibliographic References:

1. "Compilation of Air Pollutant Emmission Factors"; AP-42; U.S. Environmental Protection Agency, Research Triangle Park, NC; March 1975.

2. Ibid, "Supplement", April 1975.

3. "Environmental Narrative (Phase II)", Tab A-1, Kincheloe AFB, MI; 1975.

4. "Environmental Narrative (Phase II)", Tab A-1, Wurtsmith AFB, MI; 1975.

5. Furtado, V.C., D.R. Case, and J.R. Stencel; "Burial of Radioactive Waste in the USAF," RHL-TR-72W-9; USAF Radiological Health Laboratory, Wright-Patterson AFB OH, 1972.

6. "USAF Aircraft Pollution Emission Factors and Landing and Takeoff"; AFWL-TR-74-303; Air Force Weapons Laboratory, Kirtland AFB, New Mexico, February 1975.

ENVIRONMENTAL IMPACT ANALYSIS FOR ELLSWORTH AFB, SOUTH DAKOTA

PART

I. INTRODUCTION

A. SCOPE: Identical to pages 2-4.

B. SUMMARY OF PROPOSED ACTION AND ALTERNATIVE

1. Proposed Action: Increase the authorized strength of B-52's at Ellsworth AFB, SD, from 14 to 30, and decrease the authorized strength of KC-135's from 20 to 10. No change will be made in the authorization for EC-135 airborne command control system mission or to the Strategic Minuteman Missile Wing. These realignments would take advantage of existing facility capacity at Ellsworth and permit the Air Force to minimize capital investment for construction. Aircraft operations for both the B-52 and KC-135 will be changed proportional to the increase or decrease of assigned aircraft. This proposed action is dependent upon a decision to close Kinchloe AFB, MI, which is currently being studied, and would result in an increase of 190 military manpower authorizations at Ellsworth.

2. No Action: All existing operations at Ellsworth AFB will remain the same.

C. RESEARCH APPROACH: Identical to pages 7-9.

D. PROJECT PERSONNEL: Identical to pages 10-29.

II. COMPARATIVE ANALYSES OF PROBABLE IMPACT OF PROPOSED ACTIONS AND VIABLE ALTERNATIVES

A. SUMMARY

EARTH (AFERN 3.1)

Neither the proposed action or "no action" alternative should generate adverse effects or significantly alter the fundamental physiographic, geological and soil characteristics and properties of the area. Surface and subsurface conditions should not be changed since construction projects are not involved in either alternative. The solid waste or refuse generated should increase slightly under the candidate action due to the increase in manning. The overall effect of this increase should be minimal, and the useful life of sanitary landfills in the area should not be significantly affected.

WATER (AFERN 3.2)

An increase in water consumption and wastewater discharges on-base and in the civilian community is probable. The following increases in water and wastewater flows should be expected:

TABLE I. ESTIMATED INCREASE OF WATER/WASTEWATER FLOWS

	PROPOSED	ALTERNATIVE 1
WATER DEMAND (On-Base)	0.01 mgd	NO CHANGE
WATER DEMAND (Off-Base)	0.09 mgd	
WASTEWATER DEMAND (On-Base)	0.01 mgd	
WASTEWATER DEMAND (Off-Base)	0.06 mgd	

In summary, the effect on water quality and water supply should be negligible; however, water and wastewater systems may require some improvements, regardless of the action.

AIR (AFERN 3.3)

A comparison of the total emissions generated from base activities under the existing mission and following adoption of the proposed action is presented below:

TABLE II. POLLUTANT EMISSIONS (10^3 KGM/Yr)

	Particulate	SOx	NOx	HC	CO
Existing	150.1	50.7	475.9	1442.3	3827.1
Proposed	154.4	34.7	556.6	1334.2	3263.8
±% Change	+2.9	-31.5	+16.9	-7.5	-14.7

The balancing of the proposed action in terms of arriving and departing aircraft and personnel is such that no general statement can be made regarding emission trends. There have been infrequent excursions above the accepted maximum 24 hour standard for particulate, however this may reflect a high natural background due to the topography and climate of the area. The increases observed in particulate and NOx emissions are not anticipated to have significant impact on local or regional ambient air quality.

BIOTIC ENVIRONMENT (AFERN 3.4)

No significant impact on the biotic community is expected as a result of the proposed action. Alternative 1, the no action alternative, would result in no change at Ellsworth AFB.

UTILITIES (AFERN 4.4.2)

Implementation of the proposed action should increase the demand on utilities; however, the only inadequacies are for water distribution and possibly sewage treatment. Water storage and pumping capacity and sewage treatment facilities are limited at present, and will most probably require improvement regardless of the alternative chosen.

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

No impact on sites of historical/archeological significance is expected at Ellsworth AFB as a result of the proposed action. Alternative 1 would result in no change at Ellsworth AFB.

B. IMPACT ANALYSIS

EARTH (AFERN 3.1)

Ellsworth AFB is located on the western edge of the Great Plains approximately 9 miles east of the Black Hills, a major forested recreation area. The topography of the area is gentle rolling plain with natural drainage to the south. Vegetation in the unimproved acreage is classed as mixed grass prairie. In the absence of additional construction initiated as a result of the proposed action, there will be no impact on the fundamental physiographic, geologic or soil characteristics associated with Ellsworth AFB or its surroundings.

WATER (AFERN 3.2)

An increase in demand on water supplies and an increase in discharges of wastewaters on-base and in the civilian community is anticipated. The increases on-base will result directly from the increase in employee population, and the increases in the civilian communities will result from the increase in families residing in the area. Increased demands caused by increased industrial activity will be negligible.

Consumption of potable water is assumed at 150 gpcd for residents and 50 gpcd for nonresident base employees. The demand on-base will increase by approximately 0.01 mgd [(50 gpcd)(190 military)]. The increased demand in the civilian community should be 0.09 mgd [(150 gpcd) (190 military)(3.2 family members)].

Allowing 100 gpcd of domestic wastewater for residents and 30 gpcd for nonresidents, an increase of 0.01 mgd is expected on-base and 0.06 mgd in the civilian community.

The impact of increased water and wastewater demands on water supplies and water quality should be insignificant both on-base and in the civilian community. Water supplies are adequate for the probable increased demand; however, increased storage and pumping capacity will probably

be needed. Sewage treatment facilities may require upgrading. The City of Box Elder may construct facilities capable of handling approximately 0.1 mgd. In summary, with system improvements the impact on water supply and quality should be negligible.

AIR (AFERN 3.3)

Tables III and IV present emission inventory summaries for operations at Ellsworth AFB under the existing mission and following adoption of the proposed action. The observed changes are a result of decreases in vehicular activity and increases in emissions due to aircraft operations.

The State of South Dakota operates ambient air quality monitoring equipment at four sites within ten miles of Ellsworth AFB. These sites are specific for particulate and sulfur oxides. The federal primary standard for particulate, 260 $\mu g/m^3$ in 24 hours, has been exceeded twice within the Rapid City area during the past one and one half years. The state, in conjunction with the U.S.E.P.A. has subcontracted a private firm to evaluate the results of ambient monitoring and to present recommendations for achieving and maintaining air quality standards. Upon completion of this project, the state will evaluate the results and promulgate a control strategy which could include a transportation or land use plan.

BIOTIC ENVIRONMENT (AFERN 3.4)

As with any area of concentrated and mechanized activity, the operational activities at Ellsworth AFB generate discharges of air and water pollutants, solid wastes, noise, and other factors impacting in a negative manner on the biotic community. Such impact, within limits, is a prerequisite for maintenance and improvement of human well-being.

The proposed action will result in net increases of six aircraft and of approximately 190 military positions. These increases will result in an increased negative impact on the biotic environment, but the increase (based on projected changes in the yield of such things as air and water pollutants, solid waste, and noise) is expected to be slight and confined for the most part to the same area already impacted by base activities.

Further support for a projected insignificant negative impact are such factors as the absence of unique habitat on base and the absence, as far as is known, of any rare, threatened or endangered species on base.

TABLE III

EMISSION INVENTORY OF PRESENT OPERATIONS

Source Category	Pollutant Emissions (10^3 KG/Yr) Particulate	SOx	NOx	HC	CO
I. Transportation					
A. Road Vehicles	35.3	29.9	333.6	519.9	3207.5
B. Aircraft	99.8	12.1	77.5	469.0	583.2
C. Test Cells	0.3	0.5	4.4	9.4	10.0
Subtotal	135.4	42.5	415.5	998.3	3800.7
II. Fuel Combustion					
A. Heating Plants	6.1	8.1	41.1	2.5	6.2
B. Residential	2.4	0.1	10.1	1.0	2.5
C. Institutional	0.2	0.0	9.0	0.0	0.3
Subtotal	8.7	8.2	60.2	3.5	9.0
III. Incineration					
A. Fire Training	6.0	0.0	0.2	15.1	18.4
IV. Evaporation	0	0	0	425.4	0
GRAND TOTAL	150.1	50.7	475.9	1442.3	3827.1

TABLE IV

EMISSION INVENTORY FOLLOWING PROPOSED ACTION

Source Category	Pollutant Emissions (10^3 KG/Yr) Particulate	SOx	NOx	HC	CO
I. Transportation					
A. Road Vehicles	35.2	13.5	246.2	393.8	2619.9
B. Aircraft	104.2	12.6	246.0	488.4	607.9
C. Test Cells	0.3	0.4	4.0	8.0	8.8
Subtotals	139.7	26.5	496.2	890.2	3236.6
II. Fuel Combustion					
A. Heating Plants	6.1	8.1	41.1	2.5	6.2
B. Residential	2.4	0.1	10.1	1.0	2.5
C. Institutional	0.2	0.0	9.0	0.0	0.3
Subtotal	8.7	8.2	60.2	3.5	9.0
III. Incineration	6.0	0.0	0.2	15.1	18.2
IV. Evaporation	0	0	0	425.4	0
GRAND TOTAL	154.4	34.7	556.6	1334.2	3263.8

UTILITIES (AFERN 4.4.2)

The increase in personnel and activities at Ellsworth AFB will result in an increase in demand for potable water and sewage treatment facilities. Since utility consumption is directly proportional to an area's population, increases in the population can be directly translated to increased utility demand in the local community. Projected population increases under this alternative are 1% in Pennington County.

Aircraft fuel consumption, AGE fuel consumption, and electricity consumption are all expected to increase at Ellsworth AFB as a result of increases in the number of aircraft and personnel. Since existing structures will be used, the base heating and cooling load, and natural gas and fuel oil consumption are not expected to increase significantly.

Utility systems on-base for water and wastewater are marginal at present, and with an increased demand may require improvement. Water storage and pumping capacity may become overloaded during the summer. Sewage treatment facilities may require upgrading to improve effluent quality. Some sewage treatment may become available from the City of Box Elder in the near future. The impact of increased water system demands and sewage treatment demands will most probably make system improvements necessary.

HISTORICAL/ARCHEOLOGICAL SITES (AFERN 4.4.3.7.3)

There are no sites of historical/archeological significance on Ellsworth AFB or within a 10-radius of the base.

III. OTHER CATEGORIES

A. The Irreversible and Irretrievable Commitments of Resources:

The proposed action will result in the commitment of labor, material and energy resources devoted to the relocation effort which are considered to be irretrievably committed.

B. Unavoidable Adverse Effects and Mitigation Possibilities:

1. Sewage treatment is limited at present. A project has been initiated to evaluate the existing plant and to recommend improvements. A sewage treatment project has been proposed for Box Elder County which may be able to handle 10 percent of the base's sewage. Corrective action in this area is likely to be required regardless of alternative chosen.

2. Storage and distribution are limiting factors for the existing water supply system. The base has experienced shortages during dry summer months. Corrective action in this area is likely to be required regardless of alternative chosen.

C. Details of Unresolved Issues:

There are no known unresolved issues at this time.

D. Bibliographic References:

1. "Compilation of Air Pollutant Emission Factors"; AP-42; U.S. Environmental Protection Agency, Research Triangle Park, NC; March 1975.

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4. Furtado, V.C., D.R. Case, and J.R. Stencel; "Burial of Radioactive Waste in the USAF," RHL-TR-72W-9; USAF Radiological Health Laboratory, Wright-Patterson AFB OH, 1972.

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